

What is claimed is:

1. A diffusion bonded metallic catalyst carrier comprising: a honeycomb body composed of a piece of corrugated foil made of heat-resistant stainless steel containing aluminum and a piece of flat foil or corrugated foil made of stainless steel, the piece of corrugated foil and the piece of flat foil or corrugated foil being alternately wound or laminated on each other; and an outer cylinder made of metal into which the honeycomb body is incorporated, the honeycomb body and the outer cylinder being integrated into one body by means of diffusion bonding, wherein the surface roughness of the pieces of foil after diffusion bonding is kept so that the center line average height Ra can be 0.001 to 2.0 μm , and no sintered bridges are formed at both end portions of the joint sections of the two pieces of foil of the flat foil and the flat foil or corrugated foil in the longitudinal direction of the pieces of foil.

2. A diffusion bonded metallic catalyst carrier according to claim 1, wherein the surface roughness of the pieces of foil in the foil width direction after diffusion bonding is kept so that the center line average height Ra can be 0.001 to 2.0 μm .

3. A diffusion bonded metallic catalyst carrier according to claim 1 ~~or 2~~, wherein soldering bonding is conducted on a contact section of the piece of flat foil with the piece of corrugated foil on the entry side of exhaust gas and diffusion bonding is conducted on the delivery side of exhaust gas.

4. A diffusion bonded metallic catalyst carrier ~~according to one of claims 1 to 3~~, wherein the wave-form of the piece of corrugated foil on the entry side of exhaust gas of the catalyst carrier is formed into a trapezoid in which an area of the contact section of the piece of flat foil with the piece of corrugated foil is large, and the wave-form of the piece of corrugated foil

on the delivery side of the exhaust gas of the catalyst carrier is formed into a configuration in which an area of the contact section of the piece of flat foil with the piece of corrugated foil is not large.

5 5. A diffusion bonded metallic catalyst carrier according to one of claims 1 to 4, wherein the thickness of the piece of flat foil is not uniform, so that the thickness of the piece of flat foil on the entry side of exhaust gas of the catalyst carrier is large, and the
10 thickness of the piece of flat foil on the delivery side of exhaust gas of the catalyst carrier is small.

6. A method of manufacturing a diffusion bonded metallic catalyst carrier, the diffusion bonded metallic catalyst carrier comprising: a honeycomb body composed of
15 a piece of corrugated foil made of heat-resistant stainless steel containing aluminum and a piece of flat foil or corrugated foil made of stainless steel, the piece of corrugated foil and the piece of flat foil or corrugated foil being alternately wound or laminated on
20 each other; and an outer cylinder made of metal into which the honeycomb body is incorporated, the honeycomb body and the outer cylinder being integrated into one body by means of diffusion bonding,

the method of manufacturing the diffusion
25 bonded metallic catalyst carrier comprising the step of selecting parameters so that λb , which is defined by

$$\lambda b = C \times \delta f^{-1} \times F^{1/2} \times Ra^{-1/2} \times T^{1/4} \times \exp(15000/T) \times b^{1/2}$$

under the condition where $7.52 \times 10^9 \times \exp(-35000/T) \geq 8 \times P_{out}$ is satisfied, can be in a range from 8 to 20 where
30 thickness of the strip of foil is δf (m), center line average height of the foil surface before diffusion bonding is Ra (m), back tension in the case of winding is F (kgf), contact width of the piece of flat foil with the piece of corrugated foil or contact width of a protrusion
35 of the wave-form of the piece of flat foil with the piece

of corrugated foil is b (m), heat treatment temperature is T (K), degree of vacuum is P_{out} (Pa), and the constant of proportion is C .

5 7. A method of manufacturing a diffusion bonded metallic catalyst carrier according to claim 6, wherein surface roughness R_{ac} (m) of the strip of foil in the foil width direction is used for the center line average height R_a (m).

10 8. A method of manufacturing a diffusion bonded metallic catalyst carrier according to claim 6 ~~or 7~~, wherein material of a strip of foil is used, the surface roughness of which is 0.001 to 0.30 μm when it is expressed by the center line average height R_a .

15 9. A method of manufacturing a diffusion bonded metallic catalyst carrier according to claim 6 ~~or 7~~, wherein a strip of foil is used, the surface roughness in the foil width direction of which is 0.001 to 0.30 μm when it is expressed by the center line average height R_a .

20 10. A method of manufacturing a diffusion bonded metallic catalyst carrier ~~according to one of claims 6 to 9~~, wherein the parameters are selected so that λb can be in a range from 14 to 18.

25 11. A method of manufacturing a diffusion bonded metallic catalyst carrier ~~according to one of claims 6 to 9~~, wherein the constant of proportion $C = 6.8 \times 10^{-12}$.